SCIENCE AND PROGRESS.

EFFECTS GAINED BY ORTHOCHROMATIC PHOTOGRAPHY.

A Simple Apparatus for Measuring the Bulk of Solids—A Novel Invention That Produces Drawings and Paintings by Means of an Air Jet.

The novel invention known as the "Air brush," for producing drawings and paintings by means of an air jet, instead of using pencil or brushes, has been fully described and illustrated recently in The Scientific American. We reproduce two of the cuts for the benefit of our readers, with a brief description of the same.

FIG. 1—THE AIR BRUSH.

By means of a jet of compressed air a stream of black lead, in finely pulverized form, or a fine stream of liquid paint, is blown from the point of a needle and made to impinge on the surface of the paper, in fine or broad lines, as required by the operator, who simply holds the delivering instrument in his hand and directs the delivery of the pigment upon the paper, while with his foot he works the air compressor, as shown in Fig. 1.

The action of the hand piece is entirely controlled by the thumb valve, and the artist can produce the finest line and instantly change to a broad shadow. These effects with a single stroke have a finish that only hours of toil can equal by any other known means.

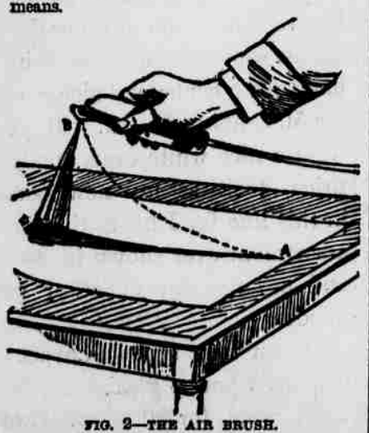


FIG. 2—THE AIR BRUSH.

It will be seen that holding the instrument low produces fine lines; and by elevating the instrument broad effects are produced, and the artist can go from line to shadow without stopping, as seen in Fig. 2. Supposing the instrument moved from A to B, following dotted lines, the effect would be as seen on the paper from A to C.

Everything about the operation of the air brush becomes perfectly automatic after a little practice, and the artist will handle it with the same ease that he now handles the brush or stump. In a word, it puts into the artist's hands at once many years of practical manipulation, which few would care to invest the large amount of time and study to attain. It does not, however, imply the entire abandonment of any of the methods now in use.

It may be well to add that the committee on science and the arts, constituted by the Franklin institute of the state of Pennsylvania, after due examination of the air brush, regard it as deserving of the warmest commendation.

Orthochromatic Photography.

Orthochromatic photography, which is now becoming an important branch of the art, is not, as many suppose, photography in colors, but rather photography of colors. If, explains Popular Science News, an oil painting is copied in the usual manner all the yellow tones, which to the eye appear light, will be more or less dark in the photograph, while the darker blue tones will be nearly white. This is due to the fact that the blue rays are accompanied by a much larger proportion of actinic or chemical rays than the yellow. By covering the sensitive plate with certain fluorescent bodies, among which eosine and erythrosine have given the best results, the length or character of the waves of colored light are so changed that they are photographed with their proper gradations of light and shade. By this process most beautiful effects have been obtained. The softness and delicacy of the shading is such that it resembles rather a crayon drawing than a photograph; and, as the process has only recently been made practical, it is probable that even greater success will be obtained with it in the near future.

Measuring the Bulk of Solids.

A simple apparatus for measuring the bulk of a solid body, without immersing the latter in water and without weighing it, is described in Chronique Industrialle, as follows: "The instrument consists of a graduated glass tube one inch in diameter, which is closed at the upper extremity with a rubber stopper, while the lower extremity is fixed in a copper box two and one quarter inches in height and four inches in diameter. The apparatus is filled with sand up to the zero of the graduation. Then it is turned upside down and the bottom of the box is unscrewed and the object inserted. After the box has been closed it is placed in its upright position. It is then only necessary to observe the level of the sand in the tube. The volume sought for will be read upon the graduated scale."

Pig Iron.

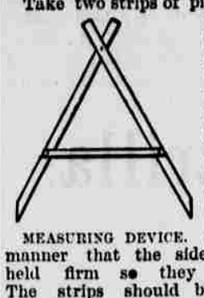
When being smelted iron flows in a molten state through a main channel scraped in the floor called a sow. On each side of the main stem are shallow ditches or molds to receive the metal. These molds are called pigs.

FARM AND GARDEN.

PLEASING PLANS FOR SUMMER HOUSES ON COUNTRY GROUNDS.

A Convenient Bag Holder—The Craze About Color in Cattle—Shoe the Horses Lightly—A Land Measuring Device That Will Be Found Useful.

Numbered with farm conveniences that can readily be constructed at home is a land measure. The cut shows one that is exceedingly simple in construction. The Indiana Farmer tells how to make and use it.



MEASURING DEVICE.

Take two strips of pine or some other light wood about seven feet long by two inches thick. Fasten the strips together at the top, spread them at the bottom so that the points will be exactly five and a half feet apart. Then nail on a cross piece in such manner that the side pieces will be held firm so they cannot spread. The strips should be shaved to a sharp point, or if iron points are fastened on they would be better, as they slip on hard ground if you are not careful. When you want to measure you take the implement, set one of its feet on the ground, then bring it in line with the side of the field. Then turn it so the other foot will touch the ground, continue turning it so as to make it step, as a mechanic does with a pair of compasses, until you have measured the side of the field. Then divide the number of steps you have made with it by three and you will have the number of rods you have passed over, as three steps makes a rod.

Another convenience for the farm described by The Indiana Farmer is a set of stakes. These are often required to start the first row with the corn planter or worker and dozens of other places. If you have the socket of an old hoe that is worn out or an old socket chisel, take it to the blacksmith and have him straighten and sharpen it. Then get good straight grained timber, that will not break if a horse steps on it, and fit the sockets on to it. You will have a stake that can be set in any ground that is not too hard to plow, and will seldom blow down. A convenient length is the width of two corn rows, which is from seven to eight feet. When not in use keep them in the tool house and you will always have them convenient for use.

Rustic Houses.

Rustic or summer houses, as the decorative little houses on country grounds are variously termed, afford an agreeable place to repose from the fatigue of a walk, or to read a book, or, in a word, to enjoy the out door air with protection from the sun and a comfortable seat on which to rest.

FIG. 1. RUSTIC HOUSE.

One of the cheapest and most simple, says The Country Gentleman, is made by setting round and moderately slender posts into the ground at the points indicated in the cut. Saw the upper ends off to a level, nailing them on narrow strips of plank for plates, setting rafters to a converging point, and covering with boards and shingles, or with lightly battened boards. The floor may be fine, smooth gravel or of boards. The seat is attached to the inner sides of the posts and supported by brackets. The whole woodwork, and especially the latticework between the posts, should be rendered durable with a heavy coat of crude petroleum applied with a coarse brush. Posts and lattice work thus treated may then become supports for the light trailing and climbing ornamental plants.

FIG. 2. RUSTIC HOUSE.

Fig. 2 represents a summer house mostly of rustic work, placed on a rise of ground for obtaining an extended view of the country. The posts may be set in the ground, as in the structure shown in Fig. 1 if the soil will admit it; or they may be secured in position by timber framework. It may be borne in mind that the posts in such structures need not be set at much depth, as they are retained in position by the rest of the framework when it is finished.

The serious mistake is sometimes made of placing too many arbors and covered seats on limited grounds. These should never be put where they do not appear to be really needed for the purpose intended; and care should be taken to adapt the peculiar structure to its proper place.

At Carson Chinese opium smokers are made to clean the streets.

"Fire Proof Paper May be Made" says a scientific exchange, "from a pulp, consisting of one part vegetable fibre, two parts asbestos, one-tenth part borax, and one-fifth part alum." It is a pity that such facts as the one following cannot be written printed or otherwise preserved, upon some sort of indestructable paper. "My wife suffered seven years and was bed ridden, too," says W. E. Huestis of Emporia, Kan., "a number of physicians failed to help her. Dr. Pierce's 'Golden Medical Discovery' cured her." All druggists sell this remedy. Everybody ought to keep it. It only needs a trial.

Roosts for Fowls.

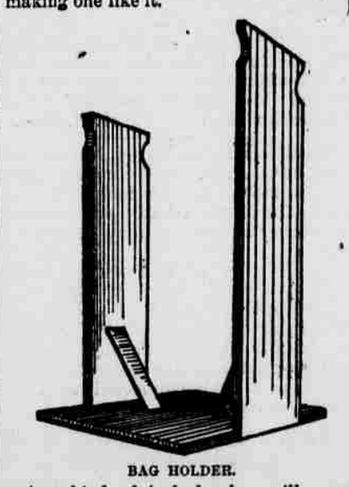
There is no advantage in placing perches one above another, stair fashion, in the hypotenuse of a triangle. If they be thus arranged the distance of the perches from each other must be measured on the base of the triangle, from the fact that the droppings fall perpendicularly. They should be far enough apart to avoid soiling of plumage.

If there is no economy of space in this arrangement, there is no argument for it. Fowls will jump from the lowest perch to the next, and so on to the highest, and then quarrel. They all want the highest place. It is preferable to have the perches placed on a level, and the platform to catch the droppings. It may be just high enough to be handy in cleaning, and the perches about one foot above it. All perches should be movable, so as to facilitate the application of kerosene, when necessary, to every part.

Perches should be at least two inches wide and rest firmly in a slot or mortise. Fowls will cling to one edge of a wide perch, and the width will give opportunity to rest the weight on the shanks. A very narrow perch makes it necessary to bear the weight on the breast bone, mainly in one spot, and thus it becomes bent to one side. This deformity is caused, in many instances, by roosting on the chine of a barrel, or on the small limbs of trees. Old fowls have their bones hardened so that they will stand the pressure without bending, but all should have wide perches.—Poultry Yard.

A Bag Holder.

Bag holders are a great convenience, and every farmer should have one or more. With the assistance of a holder, grain or other substance can be emptied into a bag by one person. A Rural New Yorker correspondent thinks his bag holder is deserving of repetition. The cut illustrates it, and we give directions for making one like it.



BAG HOLDER.

Any kind of inch lumber will serve for the bottom, which should be 18 inches square and two thicknesses of boards, one across the grain of the other, to prevent splitting. The standards are made of hard wood, 7 inches wide and 3 feet 2 inches high. The braces at the bottom are 4 inches wide and 10 inches long. The back standard is 1 1-2 inches higher than the other. The ends of the standards are hollowed, as shown in the cut. To use this holder turn the top of the bag down about two inches and place this over the standards. The spring from both sides will hold the bag open in place. Try it.

John Ruskin rises to remark wrathily that civilization is putting its best iron into iron clads and stink pots.

YOUNG FOLKS' COLUMN.

AN INTERESTING EXPERIMENT WITH A BOTTLE AND A MATCH.

The Historical Foundation for That Charming Fairy Story of Cinderella. Little Dutch Girls Who Give Too Little and Take Too Much.

The picture here presented to our young folks is from Harper's Young People, and is worthy of more than a passing glance. In the first place, it proves that human nature is pretty much the same the world over, and that little Dutch girls living away off in that flat country called Holland are not all of them exempt from selfishness, any more than are the young girls in America.

A DUTCH BARGAIN.

In matters of commerce, the fault of the Dutch
Is giving too little and taking too much.

The text at the bottom of the picture is hardly needed to explain the situation. As may be seen by all, the elder of the two Dutch maids has just taken advantage of her little companion's ignorance of the ways of the world by exchanging a very inferior doll for a superior one. Let us hope that in a short time she relented, and, ashamed of the selfishness that prompted her unjust act, returned the better doll to its rightful owner.

The quaint dress worn by these little Dutch girls is one common to the Hollanders, and is as fashionable in their country as are the dresses, shoes and hats provided for American girls fashionable here.

The Origin of Cinderella.

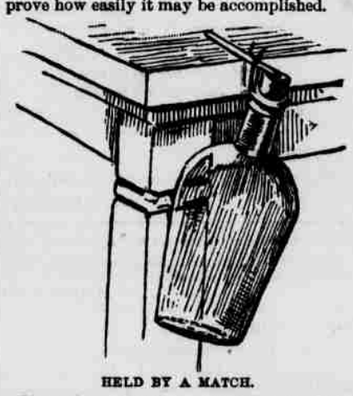
There is no fairy tale that is better known or more enjoyed by young readers than the story of the poor little cinder girl, who was so ill treated by her cruel sisters, had such a delightful godmother with a magic wand, and was so lucky as to lose her pretty glass slipper, only to gain a prince and become a princess thereby. A writer in The American Agriculturist tells the origin of this favorite fairy tale.

Cinderella's real name, it seems, was Rhodope, and she was a beautiful Egyptian maiden, who lived 670 years before the birth of Christ, and during the reign of Psammeticus, one of the twelve kings of Egypt. One day Rhodope ventured to go in bathing in a clear stream near her home, and meanwhile left her shoes, which must have been unusually small, lying on the bank. An eagle, passing above, chanced to catch sight of the little sandals, and mistaking them for a toothsome tid bit, pounced down and carried off one in his beak. The bird then unwittingly played the part of fairy godmother, for, flying directly over Memphis, where King Psammeticus was dispensing justice, it let the shoe fall right into the king's lap. Its size, beauty and daintiness immediately attracted the royal eye, and the king, determined upon knowing the wearer of so cunning a shoe, sent throughout all his kingdom in search of the foot that would fit it.

As in the story of Cinderella, the messengers finally discovered Rhodope, fitted on the shoe, and carried her in triumph to Memphis, where she became the queen of King Psammeticus, and the foundation of the fairy tale that was to delight boys and girls 2,400 years later.

An Interesting Experiment.

To suspend a bottle from a match laid on the edge of a table may seem an impossible feat, but, says St. Nicholas, experiment will prove how easily it may be accomplished.



HELD BY A MATCH.

Tie a piece of twine securely around the neck of the bottle; then lay a match on the cork, hold it firmly, bring the ends of the twine over it, and tie a tight knot, forming a loop. You may remove the match to show that you have simply tied a loop. Then insert the match through the loop, rest one end on the cork, and lay the other on the projecting edge of a table where the bottle will swing clear of any obstruction. If the match is but an inch in length, it will support the bottle quite as readily and make the feat appear all the more surprising.

The Bell of Justice.

In one of the cities of Italy, in olden times, the king caused a bell to be hung in the tower of one of the public squares, and called it "The bell of justice." It was commanded by this king that any one who had been wronged should go and ring the bell, and so call the magistrate of the city, and ask and receive justice. The story is told that when, in the course of time, the end of the bell rope rotted away, a wild vine was tied to it to lengthen it; and one day an old and starving horse that had been abandoned by its owner and turned out to die, wandered into the tower, and in trying to eat the vine rang the bell. And the magistrate of the city, coming to see who rang the bell, found this old and starving horse. He caused the owner of that horse, in whose service it had toiled and been worn out, to be summoned before him, and decreed that, as his poor horse had rung the bell of justice, he should have justice, and that during the horse's life his owner should provide him with proper food, drink and stable.

Little Rhymes for Little People.

Little Charley Cheerful,
Climbing up a tree,
Devoured all the cherries
There that he could see.
But very soon he tumbled,
And broke his little bones;
Was't because he grew so heavy
From swallowing the stones?

—Good Housekeeping.